Spot Safety Project Evaluation

Project Log # 200703111

Spot Safety Project # 08-00-207

Spot Safety Project Evaluation of the Traffic Signal Installation
At the Intersection of US 64 / NC 49 and SR 1003 (Pleasant Ridge Rd)
Randolph County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ ____7-17-2007____
Jason B. Schronce Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 08-00-207 – The Intersection of US 64 / NC 49 and SR 1003 (Pleasant Ridge Rd) in Randolph County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of an actuated traffic signal. US 64 provides a basic five lane section at this location and is met by the two lane SR 1003 (Pleasant Ridge Road) to form a three leg intersection. SR 1003 was initially under stop control. The statutory speed limit on both roads is 55 mph. During the signal installation, the raised concrete median on SR 1003 was removed to provide a through-left lane and an exclusive right turn lane onto US 64.

The original statement of problem was an increasing pattern and severity of left-turn and angle type collisions at the intersection. The intersection also met signal warrants 2, 9, and 11. A private citizen who uses the intersection daily requested the improvements.

The initial crash analysis was completed from March 1, 1997 to February 29, 2000 with ten (10) reported crashes, five (5) of which were deemed correctable by the signal. Of these five crashes, one was an angle collision and the other four involved left turning motorists. These five correctable collisions resulted in one fatality, one "A" injury, one "B" injury, and eight "C" class injuries.

The final completion date for the improvement at the subject intersection was on June 28, 2002 with a total cost of $40,000.00.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from April 1, 2002 to September 30, 2002. The before period consisted of reported crashes from January 1, 1998 through March 31, 2002 (4 years and 3 months) and the after period consisted of reported crashes from October 1, 2002 through December 31, 2006 (4 years and 3 months). The ending date for this analysis was determined by the available crash data at the time of the analysis.

The treatment data consisted of all crashes within 150 feet of the subject intersection. *Please see attached location map and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Treatment Information			
	Before	**After**	**Percent Reduction (-) Percent Increase (+)**
Total crashes	11	7	- 36.36 %
Total Severity Index	3.69	3.11	- 15.72 %
Target Crashes	5	1	- 80.00 %
Target Crash Severity Index	5.44	1.00	- 81.62 %
Volume	22,100	19,600	- 11.31 %
Injury Crash Summary			
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	2	0	- 100.00 %
Class C Injury Crashes	2	2	0.00 %
Total Injury Crashes	4	2	- 50.00 %

The naive before and after analysis at the treatment location resulted in a 36 percent decrease in Total Crashes, an 80 percent decrease in Target Crashes, and a 16 percent decrease in the Total Severity Index. The before period ADT year was 2000 and the after period ADT year was 2004.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 36 percent decrease in Total Crashes and an 80 percent decrease in Target Crashes. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have decreased at the treatment location from the before to the after period.

Referencing the *Collision Diagram*, a large portion of the target crashes at the intersection in the before period (4 of 5) were the result of a vehicle turning left onto US 64 from SR 1003. After the signal installation, this pattern was completely eliminated.

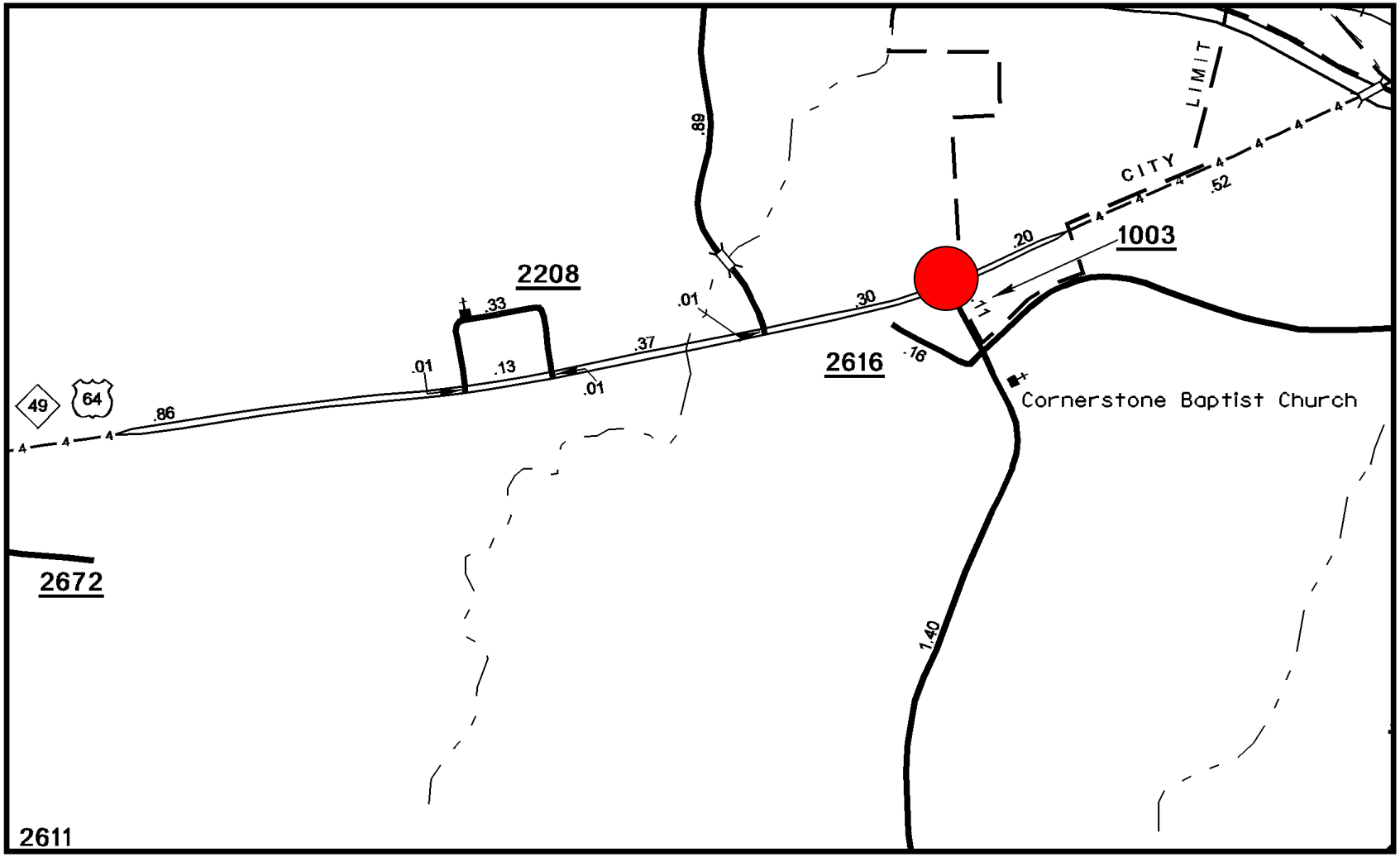
There was one rear-end crash in the before period and in the after period as a result of a eastbound US 64 vehicle attempting to turn left into Ayers Produce and Pottery. There currently exists no left turn storage lane for refuge.

The calculated benefit to cost ratio for this project is 1.14 considering total crashes. The benefit to cost ratio considering only target crashes is 1.50. The benefits are calculated using the change in annual crash costs from the before to the after period. Operational and other benefits related to the project are not considered in this analysis. The costs of the project include the actual construction costs as well as the increase in annual maintenance and utility costs.

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

Location Map
Randolph County
Evaluation of Spot Safety Project # 08-00-207



Treatment Location: US-64 at SR 1003 (Pleasant Ridge Road) near Ramseur, NC


US-64
NC-49
SR 1003
Pleasant Ridge Road
© 2007 Europa Technologies
Image © 2007 DigitalGlobe
Google
Pointer 35°43'42.45" N 79°41'04.53" W elev 574 ft Streaming 100%
Eye alt 1652 ft

TREATMENT SITE PHOTO TAKEN 7/2/2007

Traveling North on SR 1003 (Pleasant Ridge Rd)

Traveling North on SR 1003 and Pottery Store Entrance

Traveling East on US 64 / NC 49

Traveling West on US 64 / NC 49

Traveling West on US 64

View of Ayers Produce and Pottery Store Front

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: US 64 at SR 1003 | BY: JBS
COUNTY: Randolph | DATE: 5/4/2007
FILE NO.: SS 08-00-207 | NOTES: Total Crashes

DETAILED COST: TYPE IMPROVEMENT - New Signal

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	$40,000	10	0.149	$5,961
	$0	0	0.000	$0
Right-of-Way	$0	0	0.000	$0
TOTALS	$40,000	10	0.149	$5,961

ESTIMATED INCREASE IN ANNUAL MAINT. COST = $2,200
ESTIMATED INCREASE IN ANNUAL UTILITY COST = $900

TOTAL ANNUAL COST= $9,061
TOTAL COST OF PROJECT= $40,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	4.25	0	0.00	4	0.94	7	1.65	$23,365
AFTER	4.25	0	0.00	2	0.47	5	1.18	$13,059

Annual Benefits from Crash Cost Savings $10,306

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = $1,245

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 1.14

TOTAL COST OF PROJECT - $40,000 COMPREHENSIVE B/C RATIO - 1.14

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: US 64 at SR 1003 | BY: JBS
COUNTY: Randolph | DATE: 5/4/2007
FILE NO.: SS 08-00-207 | NOTES: Target Crashes

DETAILED COST: TYPE IMPROVEMENT - New Signal

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	$40,000	10	0.149	$5,961
	$0	0	0.000	$0
Right-of-Way	$0	0	0.000	$0
TOTALS	$40,000	10	0.149	$5,961

ESTIMATED INCREASE IN ANNUAL MAINT. COST = $2,200
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TOTAL ANNUAL COST= $9,061
TOTAL COST OF PROJECT= $40,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

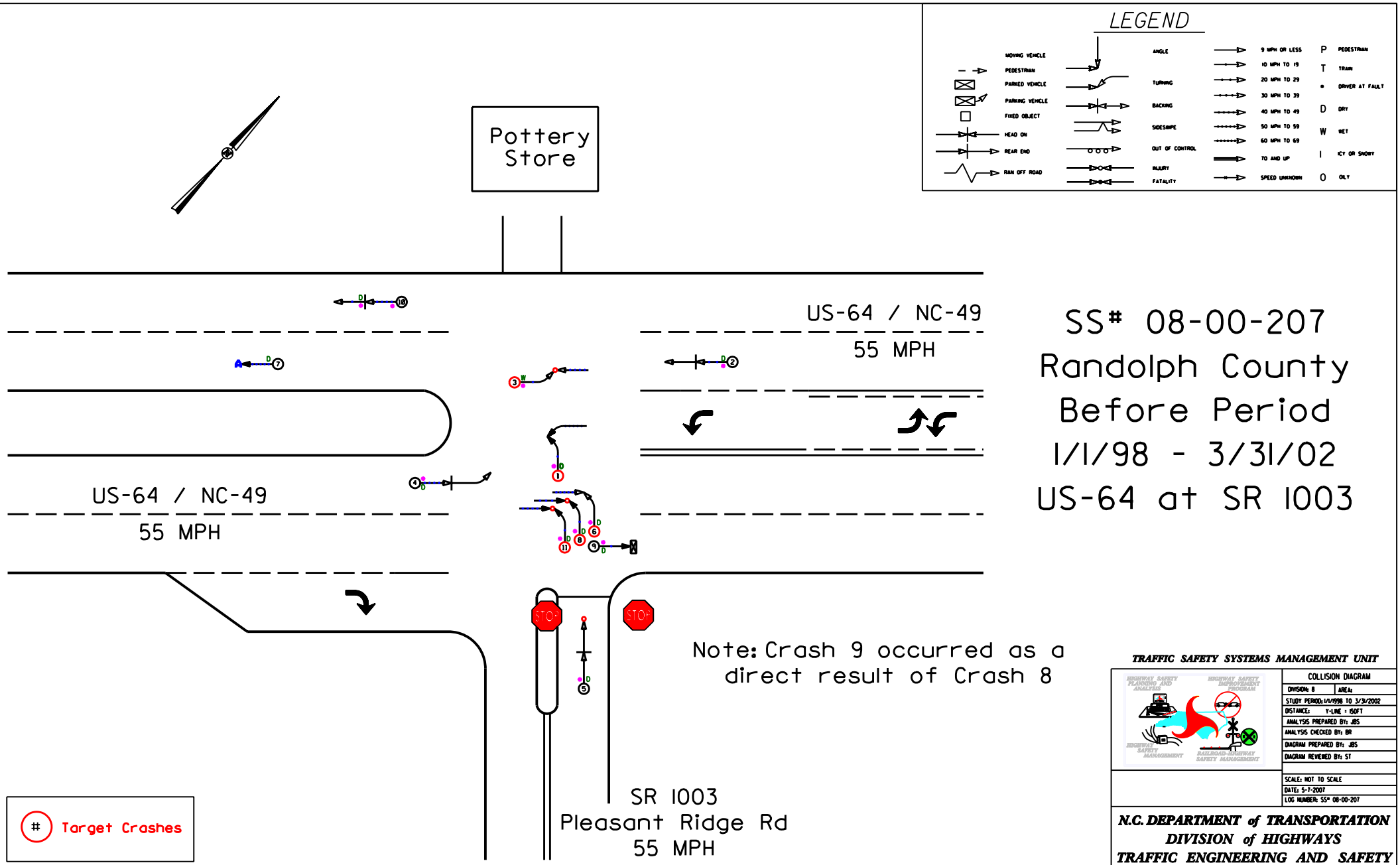
TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	4.25	0	0.00	3	0.71	2	0.47	$14,541
AFTER	4.25	0	0.00	0	0.00	1	0.24	$918

Annual Benefits from Crash Cost Savings $13,624

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = $4,562

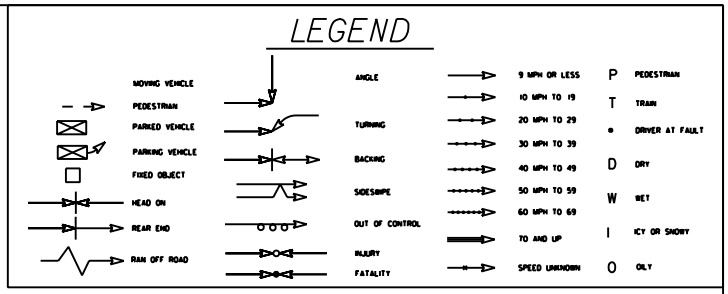
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 1.50

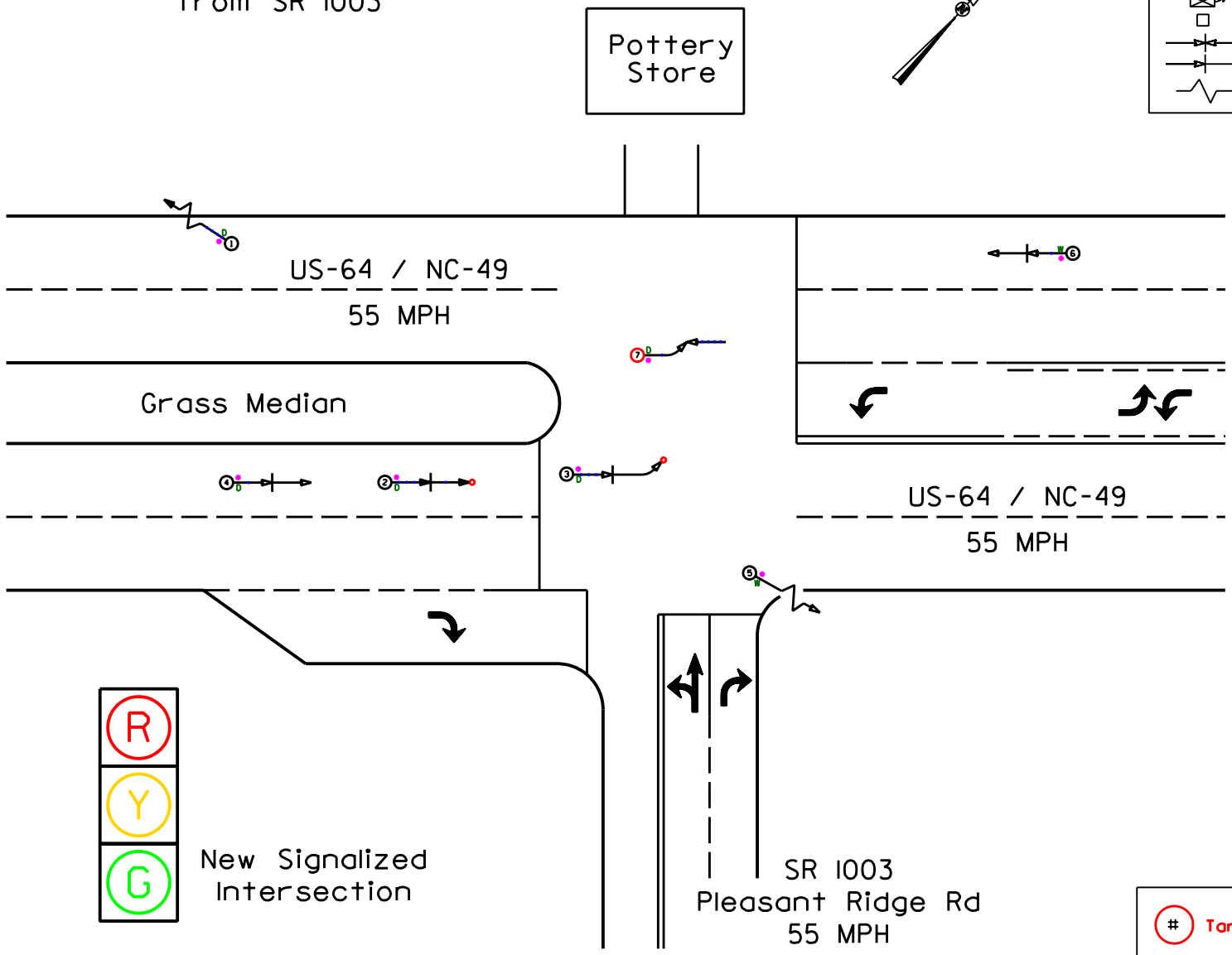
TOTAL COST OF PROJECT - $40,000 COMPREHENSIVE B/C RATIO - 1.50



08-00-207 before collision dia.dgn 07/17/2007 04:01:22 PM

Note: Crash 2 occurred when an Ambulance was making a left turn from SR 1003





SS# 08-00-207
Randolph County
After Period
10/1/02 - 12/31/06
US-64 at SR 1003

Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

COLLISION DIAGRAM

DIVISION: 8 AREA:

STUDY PERIOD: 10/1/2002 TO 12/31/2006

DISTANCE: Y-LINE ± 150FT

ANALYSIS PREPARED BY: JBS

ANALYSIS CHECKED BY: BR

DIAGRAM PREPARED BY: JBS

DIAGRAM REVIEWED BY: ST

SCALE: NOT TO SCALE

DATE: 5-7-2007

LOG NUMBER: SS# 08-00-207

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH